

CLAIMS

What is claimed is:

1. A directed reflection light collecting device with planar reflectors, comprising two or more planar reflectors, an azimuth angle adjusting mechanism and an altitudinal angle adjusting mechanism, the azimuth angle adjusting mechanism including
5 a base, supports, a circular rail with central axial line and a driving mechanism, wherein two or more planar reflectors are arranged in mutual parallel on a frame, the altitudinal angle adjusting mechanism including at least one transversal main turning shaft parallel with planar reflectors, the frame being rotatably supported via this transversal main
10 turning shaft on the supports of the azimuth angle adjusting mechanism, the altitudinal angle adjusting mechanism driving this frame in a controlled manner to move the planar reflectors, wherein the altitudinal changing angle of the planar reflectors is half of the sun altitudinal changing angle.
- 15 2. A directed reflection light collecting device with planar reflectors according to Claim 1, wherein the frame is a parallel four-connecting-rod mechanism, on the two parallel connecting rods along the length of this parallel four-connecting-rod mechanism can be hinged with two or more parallel connecting rods in height direction, the planar reflectors being respectively fixed on all parallel connecting rods moving in
20 synchronization with the parallel connecting rod mechanism in a height direction to adjust the altitudinal angle of the planar reflectors and their mutual spacing with the movement of the parallel connecting rod mechanism.
- 25 3. A directed reflection light collecting device with planar reflectors according to Claim 1, wherein the frame is two entirely identical parallel four-connecting-rod mechanism, respectively, on both sides of the planar reflectors, pivoted in the middle by parallel pivoting rods, the planar reflectors being fixed respectively on these parallel pivoting rods to adjust the altitudinal angle of planar reflectors and their mutual spacing with the movement of the parallel connecting rod mechanism.
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4. A directed reflection light collecting device with planar reflectors according to Claim 2, wherein the planar reflectors are substantially rectangular in shape, the connecting lines of four apexes of every two of the adjacent planar reflectors on the same

side generally forming a rhombus, in which one of the diagonal lines is parallel with the central axial line of the circular rail.

5 5. A directed reflection light collecting device with planar reflectors according to Claim 3, wherein the planar reflectors are in rectangular shape, the connecting lines of four apexes of every two of the adjacent planar reflectors on the same side generally forming a rhombus, in which one of the diagonal lines is always parallel with the central axial line of the circular rail.

10 6. A directed reflection light collecting device with planar reflectors according to Claim 1, wherein the frame is in an integral rigid structure, with planar reflectors fixed thereon at certain spacing in parallel, and the transversal main turning shaft in rigid connection with the frame, the altitudinal angle adjusting mechanism driving the transversal main turning shaft to rotate in a controlled way to rotate the frame, thereby
15 adjusting the altitudinal angle of planar reflectors in a synchronized manner.

 7. A directed reflection light collecting device with planar reflectors according to Claim 2, wherein the altitudinal angle adjusting mechanism comprises a reciprocating linear moving mechanism and the transversal main turning shaft, in which the
20 reciprocating linear moving mechanism is connected to one of the connecting rods of the parallel connecting rod mechanism via its moving part, a moving line of this part is parallel with one diagonal line of the rhombus, the linear movement of the moving part of reciprocating linear moving mechanism pushing the movement of the parallel four-connecting-rod mechanism to adjust the altitudinal angle and spacing of planar
25 reflectors.

 8. A directed reflection light collecting device with planar reflectors according to Claim 3, wherein the altitudinal angle adjusting mechanism comprises a reciprocating linear moving mechanism and the transversal main turning shaft, in which the
30 reciprocating linear moving mechanism is connected to one of the connecting rods of the parallel connecting rod mechanism via its moving part, a moving line of this part is parallel with one diagonal line of the rhombus, the linear movement of the moving part of reciprocating linear moving mechanism pushing the movement of the parallel

four-connecting-rod mechanism to adjust the altitudinal angle and spacing of planar reflectors.

5 9. A directed reflection light collecting device with planar reflectors according to Claim 4, wherein the altitudinal angle adjusting mechanism comprises a reciprocating linear moving mechanism and the transversal main turning shaft, in which the reciprocating linear moving mechanism is connected to one of the connecting rods of the parallel connecting rod mechanism via its moving part, a moving line of this part is parallel with one diagonal line of the rhombus, the linear movement of the moving part
10 of reciprocating linear moving mechanism pushing the movement of the parallel four-connecting-rod mechanism to adjust the altitudinal angle and spacing of planar reflectors.

15 10. A directed reflection light collecting device with planar reflectors according to Claim 5, wherein the altitudinal angle adjusting mechanism comprises a reciprocating linear moving mechanism and the transversal main turning shaft, in which the reciprocating linear moving mechanism is connected to one of the connecting rods of the parallel connecting rod mechanism via its moving part, a moving line of this part is parallel with one diagonal line of the rhombus, the linear movement of the moving part
20 of reciprocating linear moving mechanism pushing the movement of the parallel four-connecting-rod mechanism to adjust the altitudinal angle and spacing of planar reflectors.

25 11. A directed reflection light collecting device with planar reflectors according to Claim 7, wherein the reciprocating linear moving mechanism includes a screw and a nut connected with the screw, the nut being hinge supported on the connecting rod via a pin, and the screw being connected with the output shaft of the altitudinal angle driving mechanism, a rotation of this output shaft turning the screw and further moving the nut connected with it to drive the parallel four-connecting-rod mechanism via the pin on it.

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12. A directed reflection light collecting device with planar reflectors according to Claim 8, wherein the reciprocating linear moving mechanism includes a screw and a nut connected with the screw, the nut being hinge supported on the connecting rod via a

pin, and the screw being connected with the output shaft of the altitudinal angle driving mechanism, a rotation of this output shaft turning the screw and further moving the nut connected with it to drive the parallel four-connecting-rod mechanism via the pin on it.

5 13. A directed reflection light collecting device with planar reflectors according to Claim 9, wherein the reciprocating linear moving mechanism includes a screw and a nut connected with the screw, the nut being hinge supported on the connecting rod via a pin, and the screw being connected with the output shaft of the altitudinal angle driving mechanism, a rotation of this output shaft turning the screw and further moving the nut
10 connected with it to drive the parallel four-connecting-rod mechanism via the pin on it.

 14. A directed reflection light collecting device with planar reflectors according to Claim 10, wherein the reciprocating linear moving mechanism includes a screw and a nut connected with the screw, the nut being hinge supported on the connecting rod via a
15 pin, and the screw being connected with the output shaft of the altitudinal angle driving mechanism, a rotation of this output shaft turning the screw and further moving the nut connected with it to drive the parallel four-connecting-rod mechanism via the pin on it.

 15. A directed reflection light collecting device with planar reflectors according to Claim 2, wherein the transversal main turning shaft of the altitudinal angle adjusting mechanism is in rigid connection with one of the connecting rods of the parallel
20 connecting rod mechanism, a straight line passing this rigid connection point and parallel with one diagonal line of the rhombus intersects the adjacent connecting rod at another point, where a sliding block or pulley is provided and can slide along a straight sliding
25 trough mounted between the rigid connection point and the intersecting point, the transversal main turning shaft is connected with a driving motor, including a reducer, of the altitudinal angle adjusting mechanism at one end.

 16. A directed reflection light collecting device with planar reflectors according to Claim 3, wherein the transversal main turning shaft of the altitudinal angle adjusting mechanism is in rigid connection with one of the connecting rods of the parallel
30 connecting rod mechanism, a straight line passing this rigid connection point and parallel with one diagonal line of the rhombus intersects the adjacent connecting rod at another

point, where a sliding block or pulley is provided and can slide along a straight sliding trough mounted between the rigid connection point and the intersecting point, the transversal main turning shaft is connected with a driving motor, including a reducer, of the altitudinal angle adjusting mechanism at one end.

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17. A directed reflection light collecting device with planar reflectors according to Claim 4, wherein the transversal main turning shaft of the altitudinal angle adjusting mechanism is in rigid connection with one of the connecting rods of the parallel connecting rod mechanism, a straight line passing this rigid connection point and parallel with one diagonal line of the rhombus intersects the adjacent connecting rod at another point, where a sliding block or pulley is provided and can slide along a straight sliding trough mounted between the rigid connection point and the intersecting point, the transversal main turning shaft is connected with a driving motor, including a reducer, of the altitudinal angle adjusting mechanism at one end.

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18. A directed reflection light collecting device with planar reflectors according to Claim 5, wherein the transversal main turning shaft of the altitudinal angle adjusting mechanism is in rigid connection with one of the connecting rods of the parallel connecting rod mechanism, a straight line passing this rigid connection point and parallel with one diagonal line of the rhombus intersects the adjacent connecting rod at another point, where a sliding block or pulley is provided and can slide along a straight sliding trough mounted between the rigid connection point and the intersecting point, the transversal main turning shaft is connected with a driving motor, including a reducer, of the altitudinal angle adjusting mechanism at one end.

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19. A directed reflection light collecting device with planar reflectors according to Claim 1, wherein the driving mechanism to adjust the azimuth angle drives the supports and brings the planar reflectors on the frame to rotate around the central axial line of the circular rail to adjust its azimuth angle, the azimuth changing angle of which being equal to the sun azimuth changing angle, thereby realizing directed projection of sunlight in the direction of the central axial line of the circular rail.

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20. A directed reflection light collecting device with planar reflectors according to Claim 19, wherein the driving mechanism for adjusting the azimuth angle comprises a motor, including a reducer, and friction wheels connected at the motor, including a reducer, output end, the driving mechanism being fixed on the supports bottom, and the
5 rail is in rigid integration with the base, the friction wheels are in contact with the rail to drive the supports to rotate around the axial line along the rail.

21. A directed reflection light collecting device with planar reflectors according to Claim 19, wherein the driving mechanism for adjusting the azimuth angle comprises a
10 motor, including a reducer, and friction wheels connected at the motor, including a reducer, output end, the driving mechanism being fixed on the base, the rail in rigid connection with the supports and rotatably supported on the base via rollers or balls fixed on the base, the friction wheels are in contact with the rail to drive the rail itself together with the supports to rotate around the axial line.

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22. A directed reflection light collecting device with planar reflectors according to Claim 1, wherein the driving mechanism for adjusting the azimuth angle drives the supports and brings the planar reflectors on the frame to rotate around the axial line along the circular rail to adjust the azimuth angle, the azimuth changing angle of the
20 frame, the planar reflectors on the frame and the supports for the frame is half of the azimuth changing angle of the sun so that by selecting proper initial conditions, it can be realized to project sunlight in a fixed direction other than the central axial line of the circular rail.

23. A directed reflection light collecting device with planar reflectors according to Claim 22, wherein the frame is a parallel connecting rod mechanism, in which one connecting rod is in rigid connection with supports, the altitudinal angle adjusting mechanism includes at least a transversal main turning shaft that is parallel with the planar reflectors, the parallel connecting rod mechanism is rotatably supported on the
30 support via the transversal main turning shaft, and the planar reflectors are respectively fixed in parallel on all synchronously moving parallel connecting rods of this parallel connecting rod mechanism, in a ladder arrangement, and the planar reflectors moves around the transversal main turning shaft with the parallel connecting rod mechanism to

adjust their altitudinal angle and their mutual spacing to realize projection of sunlight in the set direction.

24. A directed reflection light collecting device with planar reflectors according to Claim 23, wherein the altitudinal angle adjusting mechanism also includes a screw and nut mechanism, in which a nut is hinge supported on another connecting rod, a screw is hinge supported on the support at one end via a loop, a motor output shaft is directly connected with the screw, and a motor is in rigid connection with the loop.

25. A directed reflection light collecting device with planar reflectors according to Claim 1, wherein the collecting device can also include a sensor to monitor the sun position and processing circuit, the output signal from the sensor being output to the processing circuit to control the altitudinal angle and azimuth angle adjusting mechanisms.

26. A directed reflection light collecting device with planar reflectors according to Claim 25, wherein the sensor to monitor the sun position is comprised of a light shading post, photosensitive elements arranged in four directions around the post, and a base for burying the photosensitive elements at a certain depth, wherein for each photosensitive element, a reflection shading block is arranged to shade 1/6-1/2 of a receiving window close to a light shading post side wall.

27. A directed reflection light collecting device with planar reflectors according to Claim 25, wherein the sensor to monitor the sun position is formed by a cylindrical barrel, a large lens, four small lenses and four photosensitive elements corresponding to the four small lenses, the large lens is located at the most front of the cylindrical barrel, the four small lenses in the middle of the barrel and the four photosensitive elements at the rear end of the barrel, the output ends of the photosensitive elements are connected to the processing circuit.

28. A directed reflection light collecting device with planar reflectors according to Claim 1, wherein the planar reflectors can be glass mirrors, or flat plates with high-efficiency light reflecting films applied onto their surfaces.